REMARKS

Claims 1-17 are originally pending in this reissue application. Patented claims 1-7 are allowed. New claims 8, 12 and 13 stand rejected. The Examiner has indicated that new claims 9-11 and 14-17 are objected to and would be allowable if placed in independent form.

By this amendment, however, Applicant is canceling claims 1-3 and 8-11, which are directed to an adaptive variable length coding method, without prejudice or disclaimer to their further prosecution in companion divisional reissue application S.N. 09/654,939. Thus, claims 4-7 and 12-17, which are directed to an adaptive variable length decoding method, remain in this case. Applicant is filing a preliminary amendment in application S.N. 09/654,939 that cancels the claims that are presently pending in this application, in order to avoid any double patenting issues. Finally, minor amendments are being made to claim 12 in order to correct typographical errors, but are not made in order to secure the patentability of the claims, as such patentability is apparent from the argument subsequently presented with regard to the original limitations in the claims.

Also, as a preliminary matter, Applicant wishes to express his appreciation to the Examiner for the courtesy extended to the Applicant and his representatives during a personal interview conducted on January 10, 2002. The interview offered Applicant a valuable opportunity to explain the Applicant's invention and the clear differences with respect to the cited prior art. Applicant's response to the Examiner's comment during the interview that run length codes, when decoded by a variable word length coding or decoding table, rely upon position information was addressed during the interview and is repeated subsequently.

Formalities

The Examiner has commented that the reissue application was filed without the required offer to surrender the original patent. While this statement is true, it appears the Examiner has not received the subsequently filed executed offer to surrender letters patent on November 8, 2000, together with the filing receipt. Applicant's representative showed those documents to the Examiner during the interview and agreed to forward copies with this Amendment. Applicant respectfully requests the Examiner to confirm that with submission of these documents, all requirements for a proper reissue application have been satisfied.

Claim Rejections - 35 U.S.C. § 102

Claims 8, 12 and 13 are rejected under 35 U.S.C. § 102(b) as being anticipated by Puri et al (5,227,878). This rejection is traversed with respect to claims 12 and 13 since the present invention, as set forth in claims 12 and 13, is clearly distinguishable. Moreover, with respect to claim 8, this rejection is moot in light of the cancellation of that claim in favor of the same claim in divisional reissue application S.N. 09/654,939.

Independent claim 12 is directed to an adaptive variable-length decoding method in which a combination of **intra/inter mode** information, **quantization step size** information and **scanning position** information are received and in which one of a plurality of variable length decoding tables is selected according to the intra/inter mode, quantization step size and scanning position information. Received data is then variable length decoded according to the variable length decoding table that was selected. As explained in the interview, one significant feature of the claimed invention, which is recited in the original claims 12 and 13 and distinguishes them from the prior art, is the use of position information, which necessarily relates to scanning as disclosed in the application, in the decoding table selection process. The unique origin and content of the "scanning position information" that is received provides an advantage not seen in the prior art. In fact, the prior art does not generate scanning position information as part of its encoding process nor does it receive and utilize scanning position information as part of its table selection process for decoding received data.

The importance of the scanning position information to the disclosed encoding method and corresponding decoding method is based upon (1) the use of a plurality of variable-length coding tables, each table containing unique variable-length coding information, which may be selected in order to enable a high efficiency transmission of encoded information that avoids the transmission of unnecessary data and (2) the use of block-based information, specifically scanning position information, in order to select the appropriate table. Scanning position information, as disclosed in an exemplary embodiment of the present application, is block-based information because scanning is conducted only within a single 8x8 pixel block. By using such block-based information, a fine granularity can be achieved in the digital image encoding and decoding process. The basis for greater accuracy is that during the scan of pixels within each block, according to the present invention, each of several positions in the scan of a block is

correlated to the selection of a table for encoding and decoding, on a basis as illustrated in Figs. 6A and 6B. Specifically, in those figures representing a single block of 64 pixels (8x8) and 62 quantization levels, it can be seen for both intra and inter modes, that there are different tables (T1, T2, etc.), and that one of those tables will be selected on the basis of at least the position of the scan (axis Sp, with values of 0-63). In short, for each block, optimum table selection occurs several times based on scan position, thereby providing a highly efficient and effective coding and decoding system.

With this block-based feature, using scan position-information, the invention is particularly adapted to the selection of an optimal variable-length coding table according to three distinct factors including (1) an **inter mode** (differential signal mode) and an **intra mode** (sequential processing) for coding input block image data, (2) the **quantization step size** that would applicable to encoding the discrete cosine transform (DCT) coefficients, and (3) the **scanning position** (SP) as discussed previously, particularly where a zigzag scanning is used for selection of one of the plurality of variable length coding tables. The use of these three parameters to select an optimum table in the <u>encoding</u> process may be implemented by the preferred but non-limiting embodiment illustrated in Fig. 5.

The use of these three parameters to select an optimum table in the <u>decoding</u> process would be implemented by a circuit providing the inverse of the structure of Fig. 5, with a consideration of the information that would be transmitted from the encoder/transmitter site to the decoder/receiver site, based on the disclosure found at least at col. 4, lines 1-39. As explained at column 7, lines 29-34, the inter/intra mode data and quantization step size information are transmitted in a constant period of time or are transmitted to a receiving destination whenever there is a change (e.g., based upon inter/intra mode condition). The scanning position information is not transmitted separately but is detected automatically at a receiver by accumulating the run values after obtaining [run.level] values of the decoding side. With this approach, a highly efficient system can be designed, as the content of the one variable-length coding table that is used for coding may also appear in a plurality of tables at the receiver and may be used for decoding the transmitted data.

The Puri et al reference is clearly distinguishable from the claimed invention, as it does not consider position information at all, particularly scanning position information for each

block, in the process of selecting one of a plurality of decoding tables. While Puri et al is concerned with improved compression of digital signals representing high resolution video images by using an adaptive and selective coding of digital signals relating to frames and fields of the video image, it is not concerned with the use of block-based information to select one of a plurality of variable length code tables for encoding and decoding. In this regard, the sole focus of Puri et al is on macroblock based selection of a table for encoding and decoding. For example, at col. 5, line 29, Puri et al states that "[t]he macroblock is the unit for which motion compensation and quantization modes are defined," and that explanation is followed by a focus on macroblock processing at col. 5, line 58-col. 6, line 5. Even more to the point, as explained at col. 8, lines 17-35, Puri et al states that "<u>for each</u> <u>macroblock</u> in the I- and P- pictures, the encoder I allowed to choose <u>one codebook</u> out of a small number of codebooks...for a particular macroblock, in an I- or P- picture, the codebook yielding the smallest bit-count is selected and signaled to the decoder with a 2-bit identifier." (emphasis added) For B-pictures, <u>one fixed codebook</u> is used for <u>all macroblocks</u>. Clearly, from this summary disclosure of the Puri et al operation, the reference does not consider variable length encoding within a single block, but focuses on a macroblock. For this reason, Puri does not consider "scanning position" in the selection of tables for coding or decoding.

Moreover, the structure of the Puri et al system does not consider the content of a single block for selection of one of a plurality of tables for encoding or decoding. As seen in Fig. 1A, the input video on line 10 is provided to a summing element 11, which also receives an estimate, if any, of the video signal via line 12 and produces a sum on line 13. The input video on line 10 or the summed signal on line 13 are subject to a variety of relevant determinations and analyses with regard to **inter/intra type** (44B), block adaptive frame/field coding (14), block formatting (15A) and visibility/perceptual quantization (19). The block formatted signals from formatter 15A are input to a discrete cosine transform circuit DCT 16, which processes the image macroblock or submacroblock according to whether field coding or frame coding is selected (col. 6, line 59 - col. 7, line 26). The DCT circuit 16 produces transform coefficients that are output to the quantizer 19, which quantizes the coefficients on the basis of several factors, including **inter/intra type** information from analyzer 44B. Once the DCT coefficients are quantized, they are coded for transmission, depending upon whether they are in the field coding or frame coding

modes. The quantized transformed coefficients are scanned by a scan selector circuit 23 in a predetermined order and sent to an encoder and multiplexer 24, which is operative to select between a fixed word length coding of the transform coefficients or one or more variable word length coding of the transform coefficients (col. 8, lines 36-41). The order in which the scanning selector 23 proceeds is based on the order that may be used by the encoder and the multiplexer to most efficiently encode the transform coefficients with the fewest number of bits (col. 8, lines 46-62). The parameters used in the encoding process within encoder/multiplexer 24 are based on the selection of a table within encoder/multiplexer 24.

The VWL choice analyzer is detailed in Fig. 10. In that figure, four variable word length code length tables (354-360; 388-394) for each of I (intra) and P (bped) receive amplitude and run length of each DCT coefficient provided in the transform. The tables contain data which represents the expected code length that would be produced if the DCT coefficient having an amplitude and run length as represented by the signals from the run length computers 348 are coded in accordance with four different coding schemes, as represented by each of the tables. The outputs of the tables are accumulated (372-378) and provided to a comparator 380, and a single table that provides the optimum performance is selected. The select signal output from comparator and evaluator 380 on line 382 causes the encoder 24 to select one of a plurality of coding tables stored in the encoder 24, each of which is operative to control the encoding of quantized DCT coefficients in accordance with a separate and distinct fixed word length or variable word length coding scheme. The compressed signals on an output line from encoder 24 are buffered (25) and eventually output on line 26.

During the interview, the Examiner noted that run length codes, which depend on position information, are used in the process of decoding symbols and may be relevant to the scanning position information limitation in the claim. However, Applicant noted that the claim clearly states that scanning position information is used in the process of <u>selecting a table</u>, and that this is a feature which distinguishes the invention from Puri et al. To the extent that the Puri et al system may use position information, that use could only be related to the <u>decoding process</u>, an activity that occurs <u>after</u> one table has been selected in the table selection process. Position information is not used by Puri et al in the table selection process, as expressly set forth in claim 12.

On the basis of the foregoing comparison of the disclosure in Puri et al and the claimed invention, it is clear that the subject matter of the decoder set forth in claim 12 is not anticipated, nor even obvious. The "scanning position" parameter recited in the claim is not found in the reference, nor would there be any reason for one skilled in the art to include such parameter, since the clear focus of the processing by Puri is on macroblocks or sub-macroblocks.

With regard to claim 12, Applicants respectfully submit that the <u>decoding</u> process in Puri et al would be the inverse of the <u>coding</u> process and would not anticipate nor render obvious the presently claimed invention. The distinctions with regard to the coding process also apply to the decoding process as claimed.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

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APPENDIX - B

VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE CLAIMS:

12. (Amended) An adaptive variable-length decoding method for decoding the data coded by an adaptive variable-length coding method, in a decoding system for image data, said decoding method comprising the steps of:

receiving intra/inter mode information;

receiving quantization step size information;

detecting scanning position information;

selecting one of a plurality of variable-length decoding tables according to said intra/inter mode information, quantization step size information and scanning position information; and

variable-length decoding the data received according to said selected variable-length decoding table.

Claims 1-3 and 8-11 have been canceled without disclaimer or prejudice

DO NOT ENTER! Marked up version doesn't comply w/ 37 CFR 1.173(b)